

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended):

A method of switching a Label Switch Path (LSP) in a multiprotocol label switching (MPLS) network by a Label Switch Router (LSR), the method comprising:

mapping one or more virtual circuit (VC) labels associated with a first tunnel label to a first group identification (GID);

mapping the first GID with the first tunnel label;

remapping the first GID with a second tunnel label; ~~and~~

forwarding a datagram having a VC label associated with the first tunnel label using the second tunnel label instead of the first tunnel ~~label~~.label; ~~and~~

mapping one or more VC labels associated with a third tunnel label to a second GID, the second GID being different from the first GID.

2. (original):

The method of claim 1, wherein the datagram includes the VC label that is associated with the first tunnel label before the first GID is mapped with the second tunnel label.

3. (original):

The method of claim 1, wherein mapping the first GID with the second tunnel label comprises rewriting the first tunnel label with the second tunnel label in the mapping of the first GID with the first tunnel label.

4. (cancelled)

5. (currently amended):

A method of maintaining tunnel labels by a Label Switch Router (LSR), the method comprising:

forming a label table that maps virtual circuit (VC) labels to group identifications (GIDs), each of the VC labels that was previously mapped to a same tunnel label being mapped to a same group identification;

forming a GID table that maps each of the different GIDs to a different tunnel label that identifies an adjacent LSR; and

forwarding a datagram using a VC label associated with the datagram to determine a GID for the datagram from the VC labels in the label table and using the determined GID to determine a tunnel label for the datagram from the tunnel labels in the GID table; table;

and

associating the VC labels in a group of VC labels having the same GID with a new common tunnel label by rewriting one entry in the GID table with the new common tunnel label to update the GID table and reflect the new common tunnel label.

6.-7. (cancelled):

8. (currently amended):

The method of ~~claim 6, claim 5,~~ further comprising forwarding the datagrams using the new common tunnel label by using the VC labels in the label table and the new common tunnel label in the GID table.

9. (original):

The method of claim 5, wherein the GID table further maps each of the different GIDs to a different backup tunnel label such that when a backup tunnel label indicator is set, the datagrams are forwarded using the backup tunnel label.

10. (original):

The method of claim 9, wherein the backup tunnel label is used without having to rewrite the tunnel labels in the GID table.

11. (original):

The method of claim 10, wherein the backup tunnel label is used when there is a link error.

12. (currently amended):

A computer readable medium having stored thereon sequences of instructions which are executable by a system, and which, when executed by the system, cause the system to:

form a label table that maps virtual circuit (VC) labels to group identifications (GIDs), each of the VC labels that was previously mapped to a same tunnel label being mapped to a same group identification;

form a GID table that maps each of the different GIDs to a different tunnel label that identifies an adjacent LSR; and

forward a datagram using a VC label associated with the datagram to determine a GID for the datagram from the VC labels in the label table and using the determined GID to determine a tunnel label for the datagram from the tunnel labels in the GID table. table: and

associate the VC labels in a group of VC labels having the same GID with a new common tunnel label by rewriting one entry in the GID table with the new common tunnel label to update the GID table and reflect the new common tunnel label.

13.-14. (cancelled)

15. (currently amended):

The computer readable medium of claim 13, claim 12, further comprising instructions to forward the datagrams using the new common tunnel label by using the label table and the GID table.

16. (original):

The computer readable medium of claim 15, wherein the instructions to forward datagrams using the label table and the GID table comprises instructions to use the GIDs in the label table to get the tunnel labels in the GID table.

17. (original):

The computer readable medium of claim 12, wherein the instructions to form the GID table further comprises instructions to map each of the different GIDs to a different backup tunnel label such that when a backup tunnel label indicator is set, the datagrams are forwarded using the backup tunnel label.

18. (original):

The computer readable medium of claim 17, wherein the backup tunnel label is used without having to rewrite the tunnel labels in the GID table.

19. (original):

The computer readable medium of claim 18, wherein the backup tunnel label is used when there is a link error.

20. (currently amended):

An apparatus, comprising:

a bus;

a memory coupled to the bus;

a processor coupled to the memory and the bus, the processor configured to form a label table that maps virtual circuit (VC) labels to group identifications (GIDs), each of the VC labels that was previously mapped to a same tunnel label being mapped to a same group identification,

form a GID table that maps each of the different GIDs to a different tunnel label that identifies an adjacent LSR, and

forward a datagram in a multiprotocol label switching (MPLS) network using a VC label associated with the datagram to determine a GID for the datagram from the label table and using the determined GID to determine a tunnel label for the datagram

from the tunnel labels in the GID ~~table~~table, and

associate the VC labels in a group of VC labels having the same GID with a new common tunnel label by rewriting one entry in the GID table with the new common tunnel label to update the GID table and reflect the new common tunnel label.

21. (original):

The apparatus of claim 20, wherein when the datagrams cannot be forwarded to an egress router with a current label switch path (LSP) using a current tunnel label in the GID table, a new tunnel label is used by rewriting the current tunnel label with the new tunnel label in the GID table.

22. (original):

The apparatus of claim 20, wherein when the datagrams cannot be forwarded to a next router using a current tunnel label in the GID table, a backup tunnel label in the GID table is used by setting a backup tunnel label indicator, the backup tunnel label corresponding to the GID associated with the current tunnel label.

23. (original):

The apparatus of claim 22, wherein the backup tunnel label is associated with a backup router, and wherein the backup router uses the current tunnel label in the GID table to forward the datagram from the backup router to the next router.

24. (currently amended):

An apparatus, comprising:

means for forming a label table that maps virtual circuit (VC) labels to group identifications (GIDs), each of the VC labels that was previously mapped to a same tunnel label being mapped to a same group identification;

means for forming a GID table that maps each of the different GIDs to a different tunnel label that identifies an adjacent LSR; and

means for forwarding a datagram in a multiprotocol label switching (MPLS) network using a VC label associated with the datagram to determine a GID for the datagram from the label table and using the determined GID to determine a tunnel label for the datagram from the tunnel labels in the GID table; and

means for using a backup tunnel label in the GID table to forward the datagrams to a next router instead of a current tunnel label when the datagrams cannot be forwarded to the next router using the current tunnel label, the backup tunnel label on the label stack above the current tunnel label and corresponding to the GID associated with the current tunnel label.

25. (original):

The apparatus of claim 24, further comprising means for using a new tunnel label to forward the datagrams to an egress router with a current label switch path (LSP) instead of a current tunnel label when the datagrams cannot be forwarded using the current tunnel label.

26. (cancelled)

27. (currently amended):

The apparatus of ~~claim 26, claim 24~~, further comprising means for enabling the backup tunnel label such that the backup tunnel label in the GID table is used to forward the datagrams to the next router.

28. (currently amended):

The apparatus of ~~claim 26, claim 24~~, further comprising means for using the current tunnel label in the GID table to forward the datagrams from the backup router to the next router.

29. (currently amended):

A Label Switch Router (LSR), comprising:

a bus;

a memory coupled to the bus;

a processor coupled to the memory and the bus, the processor to

map one or more VC labels associated with a first tunnel label to a first group identification (GID),

map the first GID with the first tunnel label,

remap the first GID with a second tunnel label, ~~and~~
forward a datagram having a VC label associated with the first tunnel label using the second tunnel label instead of the first tunnel ~~label.~~ label, and

map one or more VC labels associated with a third tunnel label to a second GID, the second GID being different from the first GID.

30. (original):

The apparatus of claim 29, wherein the datagram includes the VC label that is associated with the first tunnel label.

31. (original):

The apparatus of claim 29, wherein the processor maps the first GID with the second tunnel label by rewriting the first tunnel label with the second tunnel label.

32. (cancelled)

33. (currently amended):

A computer readable medium having stored thereon sequences of instructions which are executable by a system, and which, when executed by the system, cause the system to:

map one or more virtual circuit (VC) labels associated with a first tunnel label to a first group identification (GID) in a Label Switch Router (LSR);
map the first GID with the first tunnel label;
remap the first GID with a second tunnel label; and
forward a datagram having a VC label associated with the first tunnel label using the second tunnel label instead of the first tunnel label; and
map one or more VC labels associated with a third tunnel label to a second GID, the second GID being different from the first GID.

34. (original):

The computer readable medium of claim 33, wherein the datagram includes the VC label that is associated with the first tunnel label before the first GID is mapped with the second tunnel label.

35. (original):

The computer readable medium of claim 33, wherein the instructions to map the first GID with the second tunnel label comprises instructions to rewrite the first tunnel label with the second tunnel label in the mapping of the first GID with the first tunnel label.

36. (cancelled)